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For: SYSTEM FOR DISTRIBUTION AND USE
OF VIRTUAL STORED VALUE CARDS

CERTIFICATE OF MAILING

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DECLARATION UNDER 37 C.F.R. § 1.131

Commissioner For Patents
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Sir:

I, Satyan G. Pitroda, declare unequivocally:

1. That I am the sole named inventor of U.S. Patent Application Serial No.

09/612,789, filed on July 10, 2000.

2. That I conceived of the subject matter of Application Serial No. 09/612,789

at least by June 20, 2000. As of June 20, 2000, my patent attorney and I had prepared draft drawings comprising Figures 1-17 and a draft written description of the invention. Those draft drawings and draft written description are attached behind Tab A. The Microsoft Word document from which the draft was printed shows that it was last modified on June 20, 2000.

3. That the draft drawings and a draft written description include the subject matter claimed in the presently pending application. For example, the June 20, 2000 draft discloses a method of exchanging payment information in an electronic transaction comprising a first ETD

transferring payment information to a second ETD, the second ETD transferring value information back to the first ETD, and the second ETD transferring value information and payment information to a consolidation center. Ex. A, Fig. 3, Fig. 4, Fig 6, p. 13, lines 1-17, p. 26, lines 1-9.

That the June 20, 2000 draft also discloses a method of tracking retail sales of pre-paid telephone cards to cash subscribers comprising entering value purchased information and subscriber information in a retailer electronic transaction device, the retailer electronic transaction device transferring the value purchased information and subscriber information to a mobile operator, and the mobile operator adding value corresponding to the value purchased information to an account corresponding to the subscriber information. E.g., Ex. A, Fig. 5; page 12, lines 9-23; page 27, lines 1-8.


That the June 20, 2000 draft also discloses a method of distributing virtual pre-paid cards comprising creating a virtual pre-paid card, downloading the virtual pre-paid card to a retailer electronic transaction device, and transferring the virtual pre-paid card from the retailer electronic transaction device to a MO Subscriber Handset. E.g., Ex. A, Fig. 6; page 12, lines 9-23; page 27, lines 1-8.

4. That during the period of time from prior to June 20, 2000 until the filing date of July 10, 2000, I exercised diligence by reviewing subsequent drafts of the patent application and assisting in the filing of patent application.

5. That all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further, these statements were made with the knowledge that willful, false statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment or both,

79382

under Section 1001 of Title 18 of the United States Code, and that such willful, false statements
may jeopardize the validity of the above-identified application or any patent issuing thereon

 Satyan G. Pitroda

Oct 27 Date 2005

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A NEW ELECTRONIC SYSTEM FOR PRE-PAID CARDS
FOR MOBILE PHONE OPERATORS

BACKGROUND OF THE INVENTION

This invention relates to a new and improved system for distribution of pre-paid mobile voice and data services.

Wireless or mobile phone operators typically have post-pay and pre-paid subscribers for their voice & data services. Post-pay subscribers pay for airtime they use at the end of a billing period, typically at a pre-determined rate, once a month. Pre-paid subscribers, in contrast pay for a pre-set amount of airtime, at a pre-determined rate, before they start using the airtime purchased. Pre-paid subscribers essentially create a stored-value account, from which they can use the minutes that they have purchased. The mobile operator's system keeps track of the minutes purchased and subsequently used by pre-paid subscribers and prompts them as their stored-value amounts near depletion. At this point pre-paid subscribers have the option to replenish their airtime. The operation of adding more minutes of airtime to an existing pre-paid account is typically referred to as the "top-up" or "top-off" operation.

Pre-paid services are one of the fastest growing segments of the mobile telephone operator business (mobile operators or MO). Pre-paid customers require no credit, no deposits, no contracts, no account fee, no age limit, but simply a periodic top up. Pre-

paid customers may do not need to demonstrate established credit or provide any details to mobile operators.

As the cost of mobile handsets and associated infrastructure has steadily decreased over time, many markets have seen an exponential increase in mobile users. As
5 the current trend continues, the number of mobile installations may outgrow existing landlines. As the mobile handsets improve (hardware - processing power and memory, software, display – size and resolution, form factor, battery life, etc.) and the bandwidth offered by the mobile operator’s increase, the new services offered by mobile operators will increase substantially. Because of decreasing costs of the handsets and the potential
10 of value added services, mobile operators have been able to subsidize handset costs and offer pre-paid services to a large number of new customers to increase market share substantially. In some markets pre-paid customers account for as much as 70 to 80% of the total customer base. The pre-paid services have become popular for several reasons.

Pre-paid subscribers do not have to deal with long-term contracts – an element
15 typical to a lot of calling plans offered by mobile operators to essentially allow them to subsidize the cost of the mobile handset. As the cost of handsets has continued to drop, and also as handset churn rates continue to climb, subscribers have the opportunity of purchasing second hand devices, further increasing the number of overall wireless subscribers. Owing to these factors, the mobile operators can now afford to offer pre-paid
20 calling plans without any rigorous long-term contracts.

Since pre-paid calling plans do not require the subscriber to pay the charges at the end of the billing cycle, cash starved subscribers do not have to set aside any funds. This allows the subscriber to purchase service, without any elaborate budgeting.

Pre-paid subscribers do not have to deal with any unused airtime on fixed plans. For instance, typical plans will have a preset number of minutes of airtime for a certain value, which would expire at the end of the month. If these minutes are not used, they expire and the subscriber loses the value associated with the unused airtime.

5 Pre-paid subscribers do not require a credit account, or in many cases even a bank account, allowing them to purchase the service over the counter using cash, at various retail outlets and mobile operator certified distribution centers in the form of “scratch-off” plastic cards. This is ideal for the lower and middle income groups, students, and also for pre-dominantly cash economies, in emerging markets, where the pre-paid
10 product has been very successful.

Mobile Operators (“MO”) typically distribute their handsets (or alternately SIM cards) to pre-paid subscribers through controlled distribution channels – certified distribution outlets and/or participating retailers. The handsets come with some airtime preinstalled, as an incentive to the subscriber, and also allowing them to call the mobile
15 operator to setup and “top-up” an account. The top-up operation to replenish airtime for pre-paid accounts may be accomplished in one of the following ways (Figure 1 and Figure 2):

The subscriber may top-up a pre-paid account by dialing into the MO’s system, using their established payment account – credit, debit, etc. This may be done manually
20 by speaking to a MO customer service representative, by using an automated voice activated response (“VAR”) system, or through the Internet.

To manually top-up a pre-paid account, the subscriber calls an MO customer service representative, reads the pre-paid account number, and states the additional

airtime required and the preferred payment method, which involves reading the credit card account number, expiry date, etc. This typically involves a dedicated session between the subscriber and the customer service representative, which is cumbersome, labor intensive and expensive.

- 5 In contrast, the automated VAR procedure involves dialing into the MO's system, selecting the number of minutes or airtime required, and entering or setting up a payment account, typically using the MO's automated voice activated response system.

 One of the channels for top-up is through the Internet. Pre-paid subscribers may top-up their accounts by connecting to the mobile operator's pre-paid system through the
10 Internet, entering a password to access their account and top-up using a credit account.

 In addition, a subscriber may setup a new pre-paid account, or alternately top-up an existing account by going to a MO certified distribution center. These distribution centers may either be a retail environment, or possibly a certified bank that allows the subscribers to top-up their accounts using their ATM infrastructure or bank checks.

- 15 One of the more popular methods of top-up, especially for people who do not have a credit card or bank account or established credit and want to use just cash, requires purchasing a plastic card with a code for cash, which typically would be scratched off by the purchaser. These cards are distributed at the retail establishment – grocery stores, gas stations, etc. – in various denominations such as \$10, \$20, \$50, \$100, etc., where the
20 subscriber would purchase a plastic card for the amount of required airtime. This plastic card is distributed in a tamper proof package, and is purchased from a retailer. The subscriber then scratches of the code, enters this code manually through the mobile handset into the MO's system, which in turn replenishes the amount of airtime purchased

by the subscriber.

There are several disadvantages to present methods of topping-off pre-paid accounts. The mobile operators' cost for offering pre-paid airtime is as high as 20-30%. These costs are essentially incurred at various levels, for printing, packaging and
5 distributing the cards, commissions for various intermediaries, depending on the distribution channel and process adopted. The manual system incurs additional labor costs, since it requires a dedicated customer service representative to walk the subscriber through the entire setup and top-up process. Add to this, the credit card issuer's fees for the transaction ("Card Holder Not Present" (CHNP) transactions), and the overall cost
10 incurred by the mobile operator to support this distribution channel is very high.

The automated VAR channel may reduce a fraction of the cost by removing the labor component from the manual system. But this process has proven to be extremely cumbersome. Topping-up the account from the mobile device handset is awkward for the user, given the state of the handset's form factor, user interface, screen and keypad sizes.
15 Thus, errors occur, especially during the setup operation, when the user must alternatively hold the handset near the ear to hear the VAR system and then hold it in front of the eyes to dial appropriate numbers. This eventually drives impatient subscribers to less cumbersome distribution channels, which in turn have a higher cost associated to the model for the mobile operator.

20 Certified MO distributors typically provide over-the-counter service for pre-paid subscribers, which incurs retail costs, in addition to the costs mention above. Because there are only a limited number of certified centers, the overall reach of such distribution centers is limited. Since many of these certified centers have a direct hook-up into the

MO's back-end system, adding on such centers require more direct hook-ups, increasing the potential of fraud and adds to the accounting and inventory management costs.

Neutral distributors who support several mobile operators' products, typically charge a high margin for shelf space, increasing the distribution cost for the mobile
5 operator.

One of the most popular channels of distribution for pre-paid products is through existing retail distribution channels - gas stations, grocery and department stores, etc. The reach of these channels, along with the ability to use cash, are the top most reasons for its popularity, but are also the most expensive for the mobile operator to support.

10 The mobile operator incurs some cost for producing the plastic cards, packaging and distributing them. In addition, the mobile operator incurs costs for tracking and managing physical inventory, ironically for a non-physical or virtual product such as airtime.

Retailers charge the mobile operators a very high margin for the distribution of
15 these plastic cards, as they take up expensive shelf space. These margins form one of the integral components of the overall costs incurred by the mobile operator for the distribution of plastic pre-paid cards. Cash handling expenses, and credit card fees add to the overall cost, along with other cost elements typical to a retail environment.

DESCRIPTION OF THE DRAWINGS

20 Figure 1 is a diagram of a prior-art pre-paid distribution system.

Figure 2 is a flow chart of a prior art pre-paid distribution system.

Figure 3 is a diagram depicting a preferred embodiment of the electronic pre-paid distribution system of the present invention.

Figure 4 is a diagram depicting a preferred embodiment of the Retail & MO

Certified Cash & Credit Card Payment of the present invention.

Figure 5 is a diagram depicting a preferred embodiment of the Retail & MO Certified Cash & Credit Card Payment Thru MO Network of the present invention.

Figure 6 is a diagram depicting a preferred embodiment of the Retail & MO
5 Certified Cash & Credit Card Payment Thru Proximity of the present invention.

Figure 7 is a diagram depicting a preferred embodiment of the Only Credit Card Payment of the present invention.

Figure 8 is a diagram depicting a preferred embodiment of the Only Credit Card Payment Setup Sequence Flow Chart of the present invention.

10 Figure 9 is a diagram depicting a preferred embodiment of the Only Credit Card Payment “Top-Off” Sequence Flow Chart of the present invention.

Figure 10 is a diagram depicting a preferred embodiment of the Only Credit Card Payment Sample User Interfaces is of the present invention.

Figure 11 is a diagram depicting a preferred embodiment of the Only Credit Card
15 Payment Sample User Interfaces of the present invention.

Figure 12 is a diagram depicting a preferred embodiment of the Merchant Wallet Architecture of the present invention.

Figure 13 is a diagram depicting a preferred embodiment of the Merchant Wallet Sample User Interfaces is of the present invention.

20 Figure 14 is a diagram depicting a preferred embodiment of the Wallet Service Center Value Added Services of the present invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

For purposes of reference, Figure 1 is a diagram that generally depicts various

aspects of distribution of pre-paid air time. It shows existing channels of distribution for pre-paid airtime, the setup and top-up operations using a mobile handset and the mobile operator's manual or automated systems, using the mobile operator certified locations and the retail outlet model to procure plastic pre-paid "scratch-off cards"

5 Figure 2 is a flowchart depicting current distribution processes for a mobile handset with pre-paid airtime.

 Figure 3 illustrates examples of the pre-paid distribution systems of the present invention. A MO subscriber handset may be topped up by way of an electronic transaction device configured to conduct transactions from the perspective of a retailer
10 (hereinafter "Universal Merchant Transaction Card" or "Merchant Wallet"). An example of a Merchant Wallet is illustrated in Figures 12, 13, and 14. In the illustrated examples, the MO subscriber handset may also be configured as an electronic transaction device. Electronic transaction devices include, but are not limited to, devices such as the Universal Electronic Transaction Card as disclosed in U.S. Patent Nos. 5,590,038 and
15 5,884,271, which are incorporated by reference. The Merchant Wallet is in electronic communication with a MO switch, coupled to a MO Network.

 Figure 3 illustrates three examples of the invention. The first example, which is labeled "Retail Cash & Credit Card Payment," permits the MO, using a Merchant Wallet, to distribute pre-paid airtime by taking Cash or Credit Cards, Debit Cards, etc. from their
20 customers. This typically relates to the retail environment – the grocery stores, gas stations, department stores, etc. - where the retailer using the Merchant Wallet may distribute pre-paid airtime using the MO's network or a proximity method.

 The method using the MO's network involves the retailer entering relevant

subscriber requirements into the Merchant Wallet. The subscriber requirements may include various items of information, such as value purchased information and subscriber information. Value purchased information includes, for example, the quantity of airtime purchased, the quantity of funds transferred, mode of payment (*i.e.*, cash, credit, or other form of payment), authorization information, or other like information. Subscriber information includes, for example, an identification of a person providing a payment (including cash transactions), a telephone number for the MO subscriber handset, or other such information. This information is securely sent to a payment consolidation center, such as a Wallet Service Center ("WSC") (See Figs. 4, 14), through the MO switch, where the WSC will authenticate the subscriber and top-up the MO's database or pre-paid server. The MO will then send a message, for example, a Short Message Service (SMS) message, to the subscriber updating the available airtime. This method may be used with existing generation mobile handsets.

The Retail Cash & Credit Card Payment example also illustrates an example involving the transmission of a "Virtual Card" to the distribution outlets and, subsequently, to MO subscriber handsets. The MO distributes securely and wirelessly, virtual pre-paid cards to their distribution outlets, using the Wallet Service Center (Fig. 14) and Merchant Wallets at the respective distribution centers. The Virtual Cards may be distributed wirelessly and securely. The distribution outlet may use the Merchant Wallet, upon payment for airtime, to directly "beam" into the MO subscriber handset a virtual pre-paid card. "Beaming" may be accomplished using infrared, such as IrDA, proximity RF, or other suitable transmission medium. For a secure transmission of the virtual pre-paid card from the Merchant Wallet to the MO subscriber handset, an

electronic transaction device application may installed on the MO subscriber handset. A MO subscriber handset with an electronic transaction device application can also beam the payment directly into the Merchant Wallet, using either a stored value account, or an existing credit, debit, bank card, etc. account. The electronic transaction device application may store the transaction record, and upload the records to a custom transaction portal at the WSC.

The example labeled as “MO Certified Cash & Credit Card Payment” allows the subscriber to replenish their pre-paid airtime using the same methods detailed above – i.e. using the MO’s network or the proximity method. This example differs from the Retail Cash & Credit Card Payment in that the MO certified centers of distribution refers to banks, ATM’s, and other special outlets distinct from ordinary retail outlets for pre-paid card distribution. As outlined in Figure 3, these centers may also be equipped with a Merchant Wallet. Subscribers with a regular mobile handset would be able to top-up their pre-paid accounts using the MO network, and those with the electronic transaction device application installed could also use the proximity method to top-up their pre-paid account. The Merchant Wallet could be fitted with an extension termed the Merchant Wallet dB or database. This would allow the merchant or retailer to perform batch transactions, and also would allow the merchant to compile the subscriber usage information locally. In any event, the Merchant Wallet is equipped to conduct a real-time, or batch mode transaction, for both the proximity method and the method using the MO network. The Merchant Wallet dB could have a wired or wireless connection with the Merchant Wallet, or could also be connected to the merchant’s LAN. If these MO certified distributor’s have a direct interface with the MO’s pre-paid server and database,

the Merchant Wallet would integrate into their existing LAN structure.

In additional embodiments, the Merchant Wallet may be distributed to non traditional distribution outlets, such as taxi drivers, where the backend authentication hook-up may be wireless. The contemplated non-traditional distribution outlets would
5 have the ability to do real-time or batch transactions. Such non-traditional distribution channels, give the MO's the capability to transform any desired mobile handset into a potential POS.

The example labeled "Only Credit Card Payment," demonstrates the setup and top-up operations using the electronic transaction device application user interface
10 installed on the MO subscriber handset and the MO's automated system for setup and top-up operations for pre-paid airtime. The electronic transaction device application user interface gives the MO subscriber a user-friendly form factor to complete the setup and top-up operations for pre-paid airtime accounts. In one example, the electronic transaction device application may be configured to store payment information locally on
15 the mobile handset and send payment information (credit card or debit card details, etc.) every time a transaction is conducted. This information is securely sent to the WSC, through the MO switch, and to the respective payment servers and MO pre-paid server and database. Based on this process, the transaction may be considered a "Card Holder Present Transaction." Card Holder Present Transactions typically have lower processing
20 fees than Card Holder Not Present Transactions.

Figure 4 illustrates in more detail the Retail & MO certified Cash & Credit Card Payment" example. The MO subscriber handset may be configured with the electronic transaction device application application. Electronic communication, such as via

proximity RF (such as Bluetooth) or Infra Red (such as IrDA) is established with the Merchant Wallet. The Wallet is in electronic communication, preferably wireless communication, with the MO Gateway. The MO gateway is coupled to the WSC. The WSC includes, for example, an interface and security module, coupled to the MO, a
 5 payment server, content providers, Merchants, and a transaction portal. The transaction portal is coupled to a value added services module, which is coupled to a profile engine. The profile engine draws upon databases such as a MO database, a Subscriber database, and a Merchant database.

Figure 5 is a process flow-chart for the pre-paid application in a retail and MO
 10 certified environment, using either cash or credit cards as the form of payment, using the mobile operator's network. The steps include the MO Subscriber giving the Merchant Wallet equipped retailer cash or a credit card and a telephone number of the MO Subscriber handset. The Retailer enters the telephone number and desired amount of the service to purchase. Alternatively, these first steps may be performed electronically if the
 15 MO Subscriber handset includes the electronic transaction device application. The Merchant Wallet connects to the MO switch which connects to the WSC. The merchant Wallet may connect to the MO switch by simply dialing the MO or otherwise setting up communication over available data exchange formats, such as conventional CDPD, TDMA, CDMA and GSM formats. The WSC authenticates the MO Subscriber and
 20 updates the MO Prepaid Server. Additionally, the WSC updates databases for the retailer, MO Subscriber, and MO. The MO sends confirmation to the MO Subscriber, which may be by way of SMS (Short Message Service), and the Retailer acknowledges payment.

Figure 6 is a process flow-chart for the pre-paid application in a retail or MO certified environment, using either cash or credit cards as the form of payment, using the proximity transmission method. The steps include the MO distributing virtual prepaid cards to retailers. In the illustrated example, the virtual prepaid cards are distributed by the WSC to Merchant Wallets wirelessly. The MO Subscriber may purchase a Virtual Card by electronically communicating cash or credit card information from the MO Subscriber handset to the Merchant Wallet. The electronic communication may be proximity RF or Infra Red optical. The Retailer then electronically transfers the Virtual Card to the MO Subscriber's handset. A receipt may be included with the Virtual Card transfer. With regard to the MO, the Merchant Wallet sends information pertaining to the Virtual Card transaction to the MO Server by way of the WSC. The MO updates the value in the MO subscriber's account. The WSC updates databases such as the Merchant database, the MO database, and the MO Subscriber database. The electronic transaction device application on the MO handset may also update the available airtime and payment records. This example requires the MO subscriber handset to be infra red or proximity RF enabled devices (the process flow-charts in Figures 5 & 6 relate to the configuration described in Figures 3 & 4).

Figure 7 is a more detailed illustration of the "Only Credit Card Payment" example for pre-paid applications. The MO subscriber handset, including the electronic transaction device application, is in direct communication with the MO switch. The MO switch is coupled to the WSC by a MO gateway. The WSC includes, for example, an interface and security module, coupled to the MO, a payment server, content providers, Merchants, and a transaction portal. The transaction portal is coupled to a valve added

services module, which is coupled to a profile engine. The profile engine draws upon databases such as a MO database, a Subscriber database, and a Merchant database.

Figures 8 & 9 are process flow-charts which detail the setup and top-up operations for this particular pre-paid configuration.. Referring to Figure 8, an example of steps which may be used to initialize and use a MO subscriber handset with an electronic transaction device application is illustrated. A first time user activates an ETD icon and enters a MO subscriber handset personal identification number (PIN). In the illustrated example, a sequence will halt further use of the MO subscriber handset after three incorrect entries. This sequence may be performed off-line.

The MO subscriber then enters a 4 digit personal identification number (PIN) into the MO subscriber handset. This is to "tie-up" the subscriber, the MO subscriber handset, and the electronic transaction device application. This PIN will be matched internally to the unique MO subscriber handset identification number PIN and error message generated for incorrect PIN. The entry of a PIN also provides user validation for a "Card Holder Present" transaction. This sequence typically will not be repeated after the initial setup is completed successfully. On subsequent uses, only electronic transaction device PIN is required. This sequence may be performed off-line.

The MO subscriber may then select payment vendor and type, and enter a payment PIN. A Payment PIN may be pre-assigned by Payment Vendor. A Payment vendor may create a "Digital Signature" for every account and/or PIN created at the server. On verification of Payment PIN, the server will download the card details to the MO subscriber handset. The card details may include the digital signature. The digital signature is stored locally on the MO subscriber handset for subsequent use. This

sequence may be performed on-line.

The MO subscriber may then select a type of MO pre-paid card (Gold, Platinum, etc.) and an amount for the pre-paid card. The electronic transaction device may dial out to the WSC / Payment Server. The MO subscriber handset with ETD application may
5 dial out to the Wallet Service Provider and/or MO Server and download Pre-Paid Account details from the Server. This unique pre-paid account detail is stored on the MO subscriber handset for subsequent use.

When the MO subscriber confirms payment, The MO subscriber handset with ETD application may dial out to the Wallet Service Provider, debit the Payment account
10 with the amount selected, and credit the Pre-Paid account at the WSC / MO server. A receipt acknowledging the request and confirming payment may be returned to the MO subscriber handset.

The Airtime minutes available, available Credit with the Payment Partner and Receipt for the transaction may all be stored on the device. Real time data is obtained
15 from the respective servers during on-line sequence. All subsequent computations may be internal to the MO subscriber handset having the ETD application.

Referring to Figure 9, a top off sequence flow chart is illustrated. The MO subscriber activates an ETD icon on the MO subscriber handset, and then enters a PIN. The PIN is "tied-up" to the SIM Card on the MO subscriber handset. The PIN entered is
20 matched to the PIN stored in the ETD application during the setup sequence, illustrated in Fig. 8.

A display may be activated to display current airtime available for use. The MO subscriber may be queried as to whether to top off the pre-paid account. If yes, the MO

subscriber may select the top off amount, select payment and vendor type, and enter a payment vendor PIN. PINs may be different for different payment vendors.

If the PIN is correct, payment is confirmed. "PIN & Pay" triggers transmission of Digital Signature/Payment Account details stored on the device, along with the amount
5 selected. This encrypted and secure information is sent to the WSC/Payment server. On verification, the amount is debited from the Payment Server & credited to the MO Pre-paid Server. This may be the only on-line activity during the "top-off" sequence.

Figures 10 & 11 illustrate some User Interface screens on the MO subscriber handset for this particular example.

10 Figure 12 illustrates one example of the internal architecture of the Merchant Wallet. The Merchant Wallet may comprise components similar to or the same as a mobile handset – keypad, internal hardware, software & BIOS, the mobile operator's connectivity interface (Analog, Digital, PCS, GSM, etc.) and the wireless interfaces for proximity transmission using infrared or possibly proximity RF. The Merchant Wallet, in
15 addition to the above components typical to mobile handsets, may also have the interfaces for receipt printers and other peripherals commonly used in a retail environment, such as bar-code scanners, etc. In one example, the Merchant Wallet is a software application installed on an existing mobile handset. In alternative examples, the Merchant Wallet may be a PDA or dedicated hardware embodiment with the above
20 outlined modules and enabling software, to conduct secure real-time or batch transactions.

The Merchant Wallet includes a software application loaded into the environment, which will allow it to exchange transaction information with another mobile handset with

the electronic transaction device functionality (or alternately a UET Card – PDA's, etc., with electronic transaction device functionality), using a proximity method, or using the MO. The proximity method involves the beaming of a virtual pre-paid card from the Merchant Wallet to the subscriber's handset, and optionally, the electronic transaction device beaming payment information back into the Merchant Wallet. The Merchant Wallet has the capability to capture this transmission through its infrared or proximity RF transceivers, and process it to complete the transaction. This information is transmitted between the two handsets using existing industry standards and protocols, but is a secure transmission. One example of a server transaction uses the exchange of public/private keys to encrypt/decrypt the data – a PKI scheme), using secure transaction technology ensuring data integrity between the two mobile handsets or devices.

Alternatively, the Merchant Wallet may also be programmed to securely upload or beam a “virtual pre-paid airtime card” to another mobile handset in a proximity transmission, maintaining the integrity of the mobile operator's card distribution schemes. The Virtual Card is an electronic version of the physical plastic card. The information, be it an authorization code which is scratched off or any other encoded data, would be transmitted to the Merchant Wallet and stored, and consequently delivered or re-transmitted to the receiving mobile handset. One possible configuration of a non-proximity model would include a series of SMS messages between the mobile operator's network and the Merchant Wallet. Figure 13 describes some User Interface potential screens for the Merchant Wallet, which are based on the process flow charts detailed in Figures 5 & 6.

Figure 14 describes the architecture of the Wallet Service Center (WSC). The

WSC essentially is connected to the mobile handsets or electronic transaction devices through the MO's switch. The WSC also has interfaces to the MO's servers and databases, the Banks or Payment Partners, the Merchants (retail, "e or m-tailers") and Content Providers. The WSC essentially uses a PKI/wPKI based security scheme to

5 secure all the information being transmitted between the various entities outlined above.

Some of the core features of the WSC are to support electronic transaction device users and allow all users to create a personalized transaction portal - allow them to archive all transaction records, and setup personal, financial and health information. The WSC, based on the rich profiles it creates, then offers various value added services, such as

10 Personal Services, Financial Services, Health Services, Merchant & Vendor Services, Business to Business Services, and Government, Corporate and Educational Services.

Figure 15 illustrates the "Virtual Card" Generation & Download configuration. The "Virtual Card" is an electronic version of plastic cards. A Virtual Card is a digital representation of the information which would be conventionally stored on a magnetic

15 stripe, or smart card chip, or a bar code, etc., of a plastic card, along with the logo and branding information securely stored to prevent unauthorized duplication. This information may then be wirelessly transmitted to the MO subscriber handset, PDA, etc. with electronic transaction device application. The "Virtual Card" generation module is responsible for the creation of Virtual Cards. In one embodiment (labeled A), the "Virtual

20 Card" Generation Module may be hosted in the WSC. The WSC, which has access to the MO's Prepaid Server and databases, would then create a virtual pre-paid card. This virtual pre-paid card may then be downloaded, or transmitted wirelessly using the MO's Switch to the Merchant Wallet, or alternately directly into the subscriber's mobile phone.

Secure batches of virtual pre-paid cards may be created and downloaded to the Merchant Wallet, to then be distributed wirelessly by the Merchant Wallet using a proximity method (as outlined in Figures 4 & 6).

In another embodiment, the Virtual Card generation module may be hosted
5 outside the WSC, but within the MO's Network (labeled B). As may be the case with the generation of Credit Cards, Debit Cards, etc., the Banks and Financial Institutions may not be comfortable with another entity issuing their cards. In such a case, the Virtual Card generation module would be integrated with the Bank's or Financial Institution's payment server. These cards may still be wirelessly downloaded through the MO's
10 Switch.

Figure 16 describes a "Stored Value Application." Similar to the methods described earlier to setup or replenish a pre-paid airtime account (or disable), the mobile operator may setup a stored value account for their subscribers. The Wallet Service Center may create and manage such separate accounts for the mobile operator's
15 subscribers. The mobile operator's pre-paid server tracks the airtime the subscribers buy and use. Similar to that account, the Wallet Service Center may create a stored value account, where the subscriber would create a debit account by depositing funds with the mobile operator. The subscriber may then purchase goods from a merchant location using a Merchant ETD through either of the methods described earlier – i.e. by using a
20 proximity transaction method, or alternately using the mobile operator's switch. Thus now for instance, a subscriber may purchase products and services catered by the merchant (not only, or necessarily pre-paid airtime), using a MO subscriber handset or a ETD - the merchant would then follow the same methods described earlier, except they

would deduct the amount of the transaction for goods purchased from the stored value account the subscriber creates with the mobile operator. The authentication of the transaction may still involve both the merchant and the subscriber through possibly a messaging system operated by the mobile operator. A record of the transaction may be
5 provided by the WSC, and/or through the mobile operator's messaging service.

Alternately, the Merchant ETD is capable of directly downloading a record of the transaction to the subscriber's ETD, using a proximity transmission scheme (Ir or proximity RF). The Wallet Service Center could possibly create and track this account for the mobile operator, as the subscriber uses the funds from this account to pay for products
10 and services purchased from the merchant location.

In another embodiment, the subscribers with a stored value account, may use the Merchant ETD for cash advances, i.e. liquidate a certain amount of their debit (or credit) account setup with the mobile operator using a Merchant ETD. The Merchant ETD effectively becomes an ATM outlet. The billing in either of these cases, may be in the
15 form of a consolidated statement from the mobile operator, detailing the airtime used followed by a section detailing how the stored value account was depleted, or in the form of two separate billing statements. The mobile operator may alternately decide to add a credit functionality to this process, and essentially become a credit account vendor as well. The Wallet Service Center could possibly use the mobile operator's messaging
20 system to update the subscriber's handset with most current balances of both accounts, or alternately this could be a feature of the ETD.

Figure 17 describes an environment in which a single Merchant ETD has the capability to interface with multiple mobile operator networks for the purposes of

offering electronic pre-paid airtime or stored value applications, as outlined before, to their respective subscribers. An example would be a single merchant location, enabled with a single Merchant ETD unit, having the capability to electronically issue pre-paid airtime to Sprint PCS, Cellular One, AT&T, PrimeCO, Bell Atlantic, Bell South, etc.

5 subscribers. This same Merchant ETD would also have the capability to allow all the different subscribers to use their respective stored value accounts hosted by the respective mobile operators.

Based on the above description of the electronic transaction device application and Merchant Wallet architecture and configurations, and using the earlier section on the
10 disadvantages of the existing models of distribution as an outline, following are the advantages in using the electronic transaction device application & Merchant Wallet distribution models:

Based on the nature of the electronic transaction device application transaction, whereby the payment information (credit card details, account number, etc.) is stored and
15 transmitted from the mobile handset, only after being initiated by the user (user enters unique password, which along with a unique handset device number – SIM, WIM, etc. – is translated into a unique key, or treated as a “digital signature” to validate the transaction) – the transaction is of a “Card Holder Present” nature. The electronic transaction device application allows the subscriber to use a credit card to setup and top-
20 up their pre-paid account, and at the same time allows the mobile operator to pick up the savings of the reduced credit card issuer fee for a “CHP” transaction.

Using the electronic transaction device application User Interface, the subscriber now has a simple menu driven, graphical, user friendly procedure of selecting the amount

of airtime required, and the payment vendor and account (credit, debit, etc.) to be used.

The electronic transaction device application on the mobile handset will also allow the subscriber to store the receipt of the transaction, show the updated airtime and payment account balances. Thus the mobile operator may now use the electronic transaction

5 device application on mobile handsets, along with its automated system, to allow their pre-paid subscribers to setup & top-up their accounts using their handsets. This removes the requirement of a customer service representative to have a dedicated session with the subscriber, and also offers a lot less cumbersome alternative to the automated setup and top-up methods.

10 The Merchant Wallet may be used for distributing pre-paid airtime, either using the MO's network and existing mobile handsets, and later on by issuing "virtual pre-paid cards." The Merchant Wallet may be used in a retail environment or at the certified distribution centers – bank locations, ATMs, or over the counter locations. The Merchant Wallet supports cash, credit card, debit card, etc. transactions. The Merchant Wallet

15 allows the mobile operator to immediately reduce all costs associated with the generation, packaging and distribution of physical plastic cards. The Merchant Wallet also allows the mobile operator to remotely issue and track the distribution of their pre-paid products, removing all costs associated with the physical tracking of inventory. This model also gives the mobile operator the flexibility to enhance the services and products, and at the

20 same time rapidly deliver these new offerings to their subscribers.

The same set of advantages applies to the merchants in the retail and virtual (e & m-tailers) environments. These advantages may be summarized as follows:

The mobile operator may use the Merchant Wallet to distribute pre-paid "Virtual

Cards”, thereby immediately reducing all costs associated with the generation, packaging and distribution of plastic. Since the Merchant Wallet eliminates the requirement of shelf space, and also removes the element of “physical inventory management” on the retailers part, the mobile operator is essentially in a position to negotiate reduction in retailer
5 margins.

The Merchant Wallet may also be used to enhance or upgrade the current offering of products and services, and rapidly and remotely deliver these to their subscribers, with minimal costs associated. Add to these savings, the savings associated with the card holder present transaction, when the electronic transaction device application is used by
10 the subscriber, and subsequently reduction in cash handling costs, etc.

In conjunction with the electronic transaction device application and Merchant Wallet products, the Wallet Service Center (hereby incorporated by reference) also allows the mobile operator to create a trail of otherwise untraceable “cash” transactions/subscribers. This is beneficial in terms of allowing the mobile operator to
15 better understand their subscribers and cater additional products and services to them. This also, in light of law enforcement requirements by government agencies, allows the mobile operator and law enforcement agencies to track unlawful use of pre-paid phones.

In summary, present invention is that it allows MO's to extract more value, and hence immediate profitability, from their existing distribution models – be it in terms of
20 eliminating cost of producing and distributing plastic, or the high commission paid to the retailers, or the CHP nature of all credit card transactions. The present invention allows the mobile operator to create alternate distribution channels, giving them the ability to modify each existing mobile handset into a potential point of sale terminal.

The electronic transaction device application gives the mobile operator the presence on the subscriber's handset, the Merchant Wallet gives them the ability to distribute products and services in a retail environment, essentially taking the mobile operator beyond the m-commerce space. The WSC gives the mobile operator the ability to continuously keep adding on value added services for their subscribers, merchants and vendors. Some of the advantages of the WSC, in conjunction with the Merchant Wallet and electronic transaction device application are:

Tracking: The mobile operator now has the ability to create a trace of their subscribers, including the subscribers that typically pay cash and leave no personal information behind. The WSC creates a profile for each subscriber, whether they use cash or credit cards, or debit cards, etc. to pay for the pre-paid airtime. This is also helpful for the law enforcement agencies to curb the misuse of pre-paid phones for unlawful activities.

Management: The WSC allows the mobile operator to efficiently track the airtime top-up for all their subscribers, independent of who the subscriber is or how they purchased their pre-paid airtime. The WSC creates a better and more efficient management system between the mobile operators and various distributors they use in the retail and non-retail environment.

The WSC, along with the electronic transaction device application and Merchant Wallet, creates the optimum platform for the mobile operator to offer various value added services and products to their subscribers, merchants and services. The stored value application is an example of how the mobile operator may use the same infrastructure installed to electronically distribute pre-paid airtime, to allow their subscribers to buy

products and services from the merchants equipped with a Merchant ETD.

What is claimed is:

1. A method of exchanging payment information in an electronic transaction,
comprising:
 - a) a first electronic transaction device transferring payment
5 information to a second electronic transaction device;
 - b) the second electronic transaction device transferring value
information to the first electronic transaction device;
 - c) the second electronic transaction device transferring value
information and payment information to a service consolidation center.
- 10 2. The method of claim 1, wherein the value information comprises a virtual
card.
3. The method of claim 2, wherein the virtual card comprises an
authorization code.
4. The method of claim 2, wherein the virtual card comprises an image of a
15 card.
5. The method of claim 1, wherein the value information comprises a
quantity of minutes corresponding to a prepaid telephone account.
6. The method of claim 1, wherein the payment information comprises cash
payment information.
- 20 7. The method of claim 6, wherein the cash payment information includes an
identification of a person providing a cash payment.
8. The method of claim 1, wherein the payment information comprises credit
payment information.

9. A method of tracking retail sales of prepaid telephone cards to cash subscribers comprising:

- a) entering value purchased information and subscriber information in a retailer electronic transaction device;
- 5 b) the retailer electronic transaction device transferring the value purchased information and subscriber information to a mobile operator;
- c) the mobile operator adding value corresponding to the value purchased information to an account corresponding to the subscriber information.

10. The method of claim 9, wherein the step of entering value purchased information and subscriber information in a retailer electronic transaction device further comprises electronically transferring the value purchased information and subscriber information from a MO subscriber handset to the retailer electronic transaction device.

11. The method of claim 9, wherein the step of entering value purchased information and subscriber information in a retailer electronic transaction device further comprises manually entering the value purchased information and subscriber information into the retailer electronic transaction device.

12. A method of distributing virtual prepaid cards comprising

- a) creating a virtual prepaid card;
- b) downloading the virtual prepaid card to a retailer electronic transaction device,
- 20 c) transferring the virtual prepaid card from the retailer electronic transaction device to a MO subscriber handset.

13. The method of claim 12, further comprising the step of transferring

payment information from the MO subscriber handset to the retailer electronic transaction device.

14. The method of claim 12, wherein the step of creating a virtual card is performed by an electronic transaction device service center.

5 15. The method of claim 14, further comprising the steps of:

d) transferring payment information and subscriber information from the MO subscriber handset to the retailer electronic transaction device; and

e) transferring the payment information and subscriber information from the retailer electronic transaction device to the electronic transaction device service center.

10 16. The method of claim 14, wherein the step of downloading the virtual card to a retailer electronic transaction device occurs via a MO switch.

17. The method of claim 12, wherein the step of creating a virtual card comprises creating a plurality of virtual cards and the step of downloading the virtual card to a retailer electronic transaction device comprises downloading batches of virtual transaction cards to the retailer electronic transaction device.

15

Existing Pre-Paid Distribution System

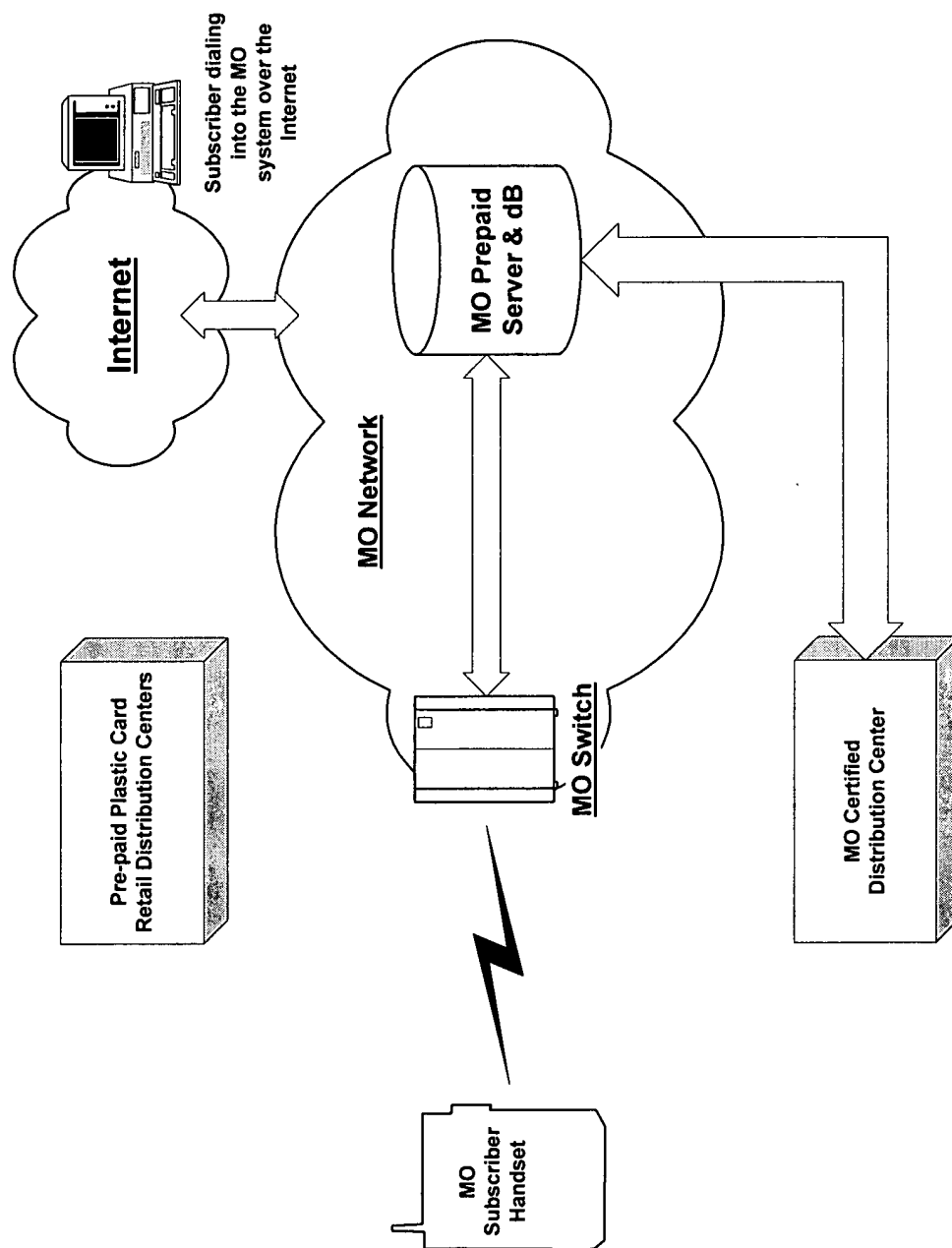


Figure 1

Existing Pre-Paid Distribution Flow

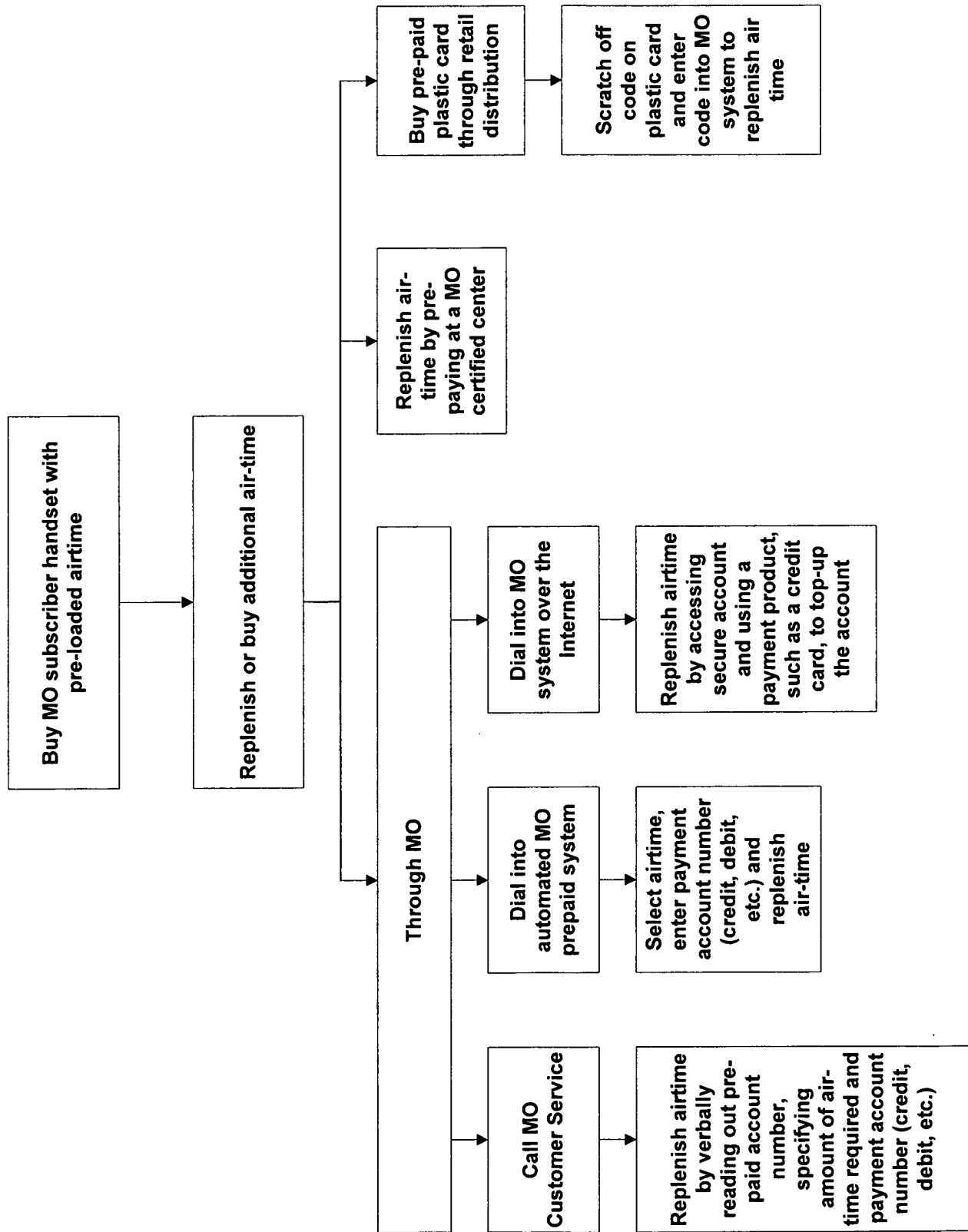


Figure 2

Electronic Pre-paid Distribution System

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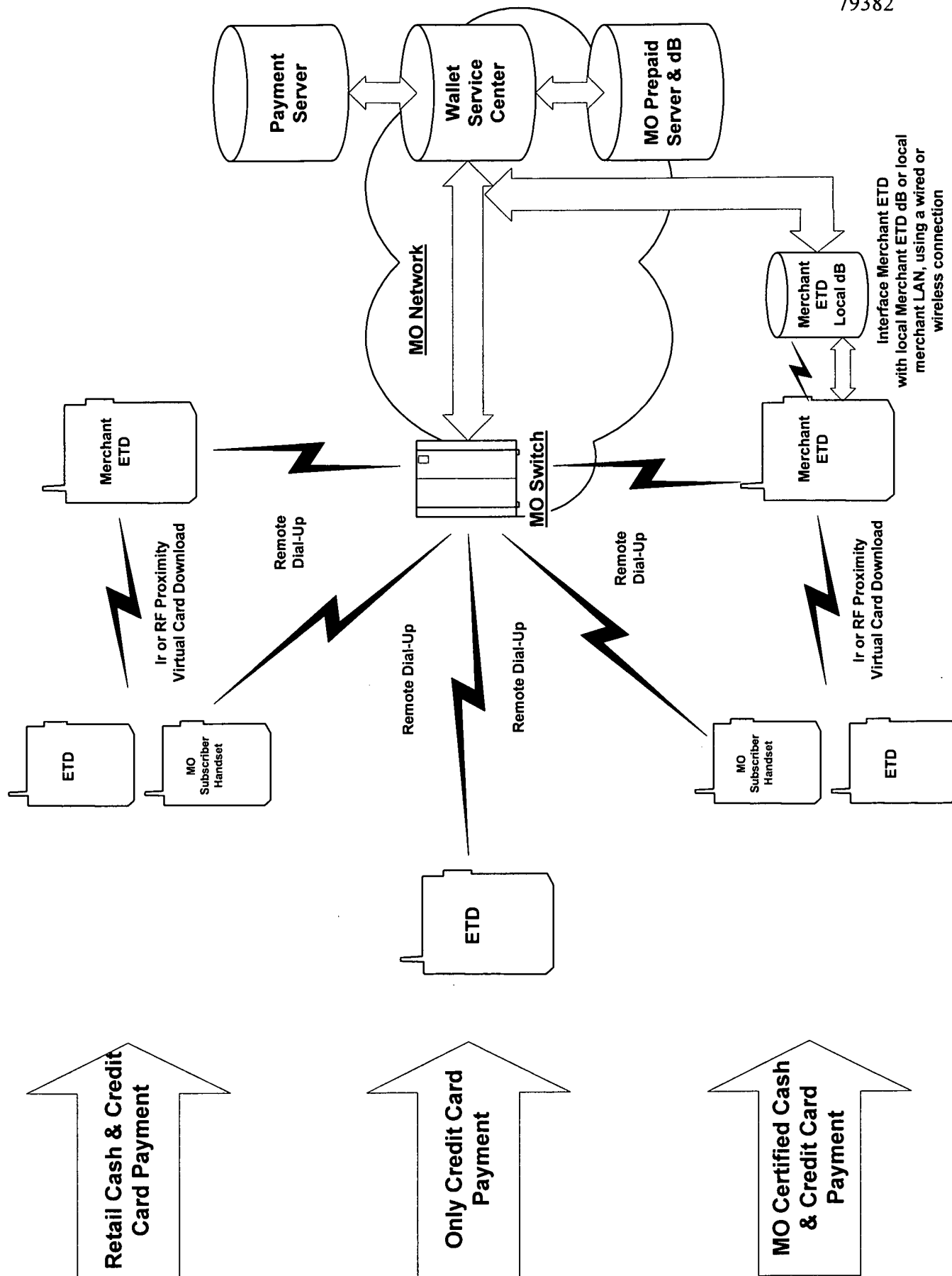


Figure 3

**Retail & MO Certified
Cash & Credit Card Payment**

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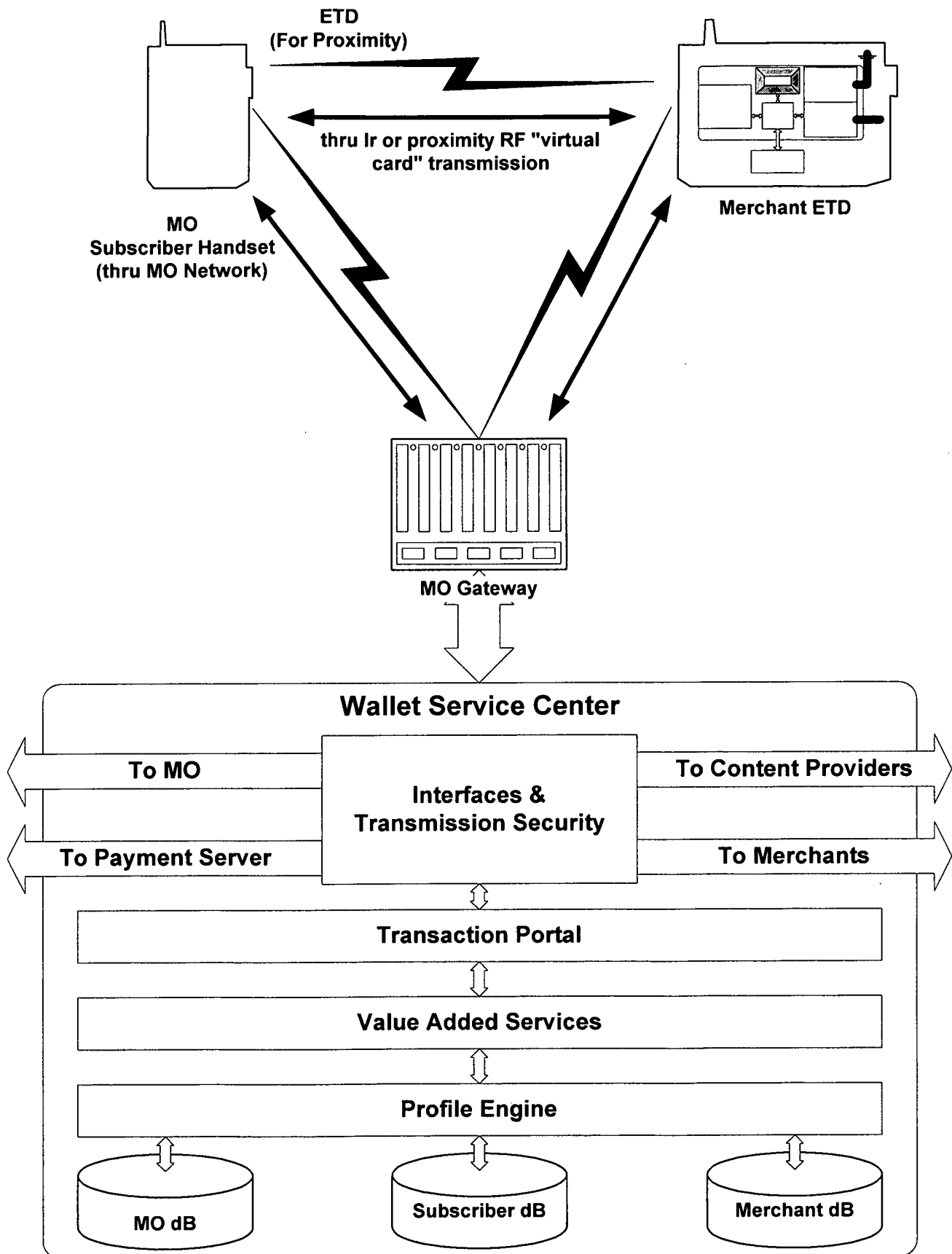


Figure 4

Retail & MO Certified
Cash & Credit Card Payment
Thur MO Network

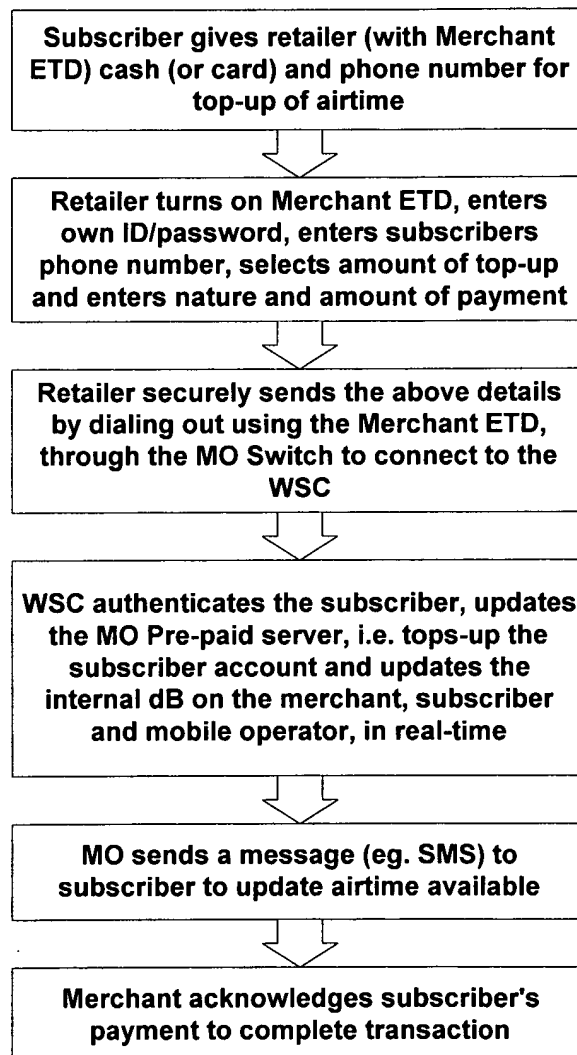


Figure 5

Retail & MO Certified
Cash & Credit Card Payment
Thru Proximity

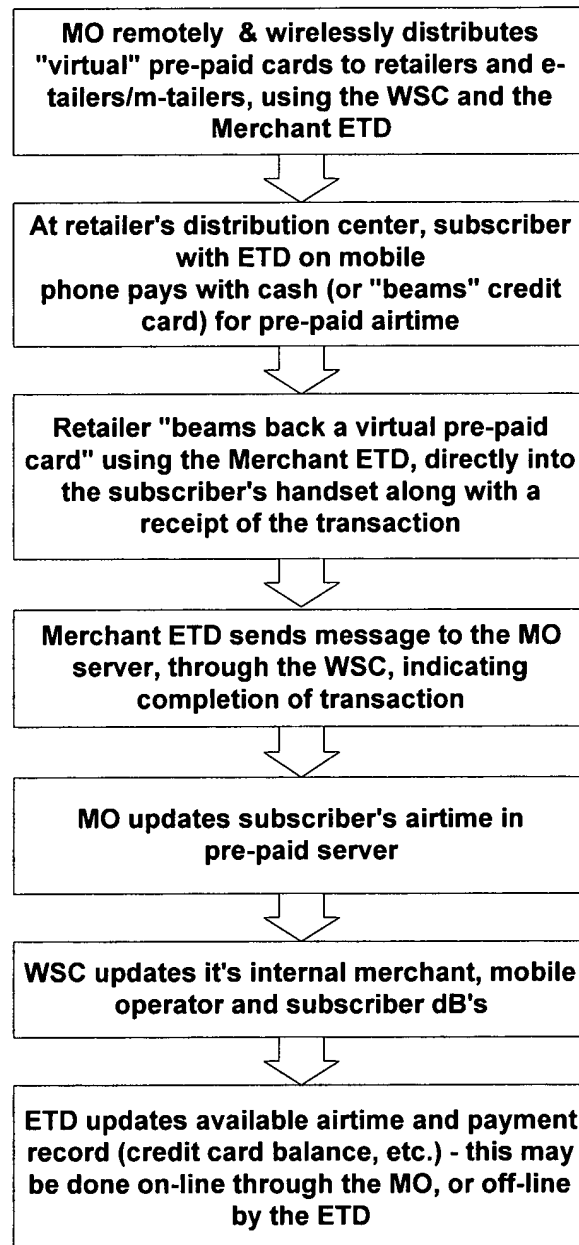


Figure 6

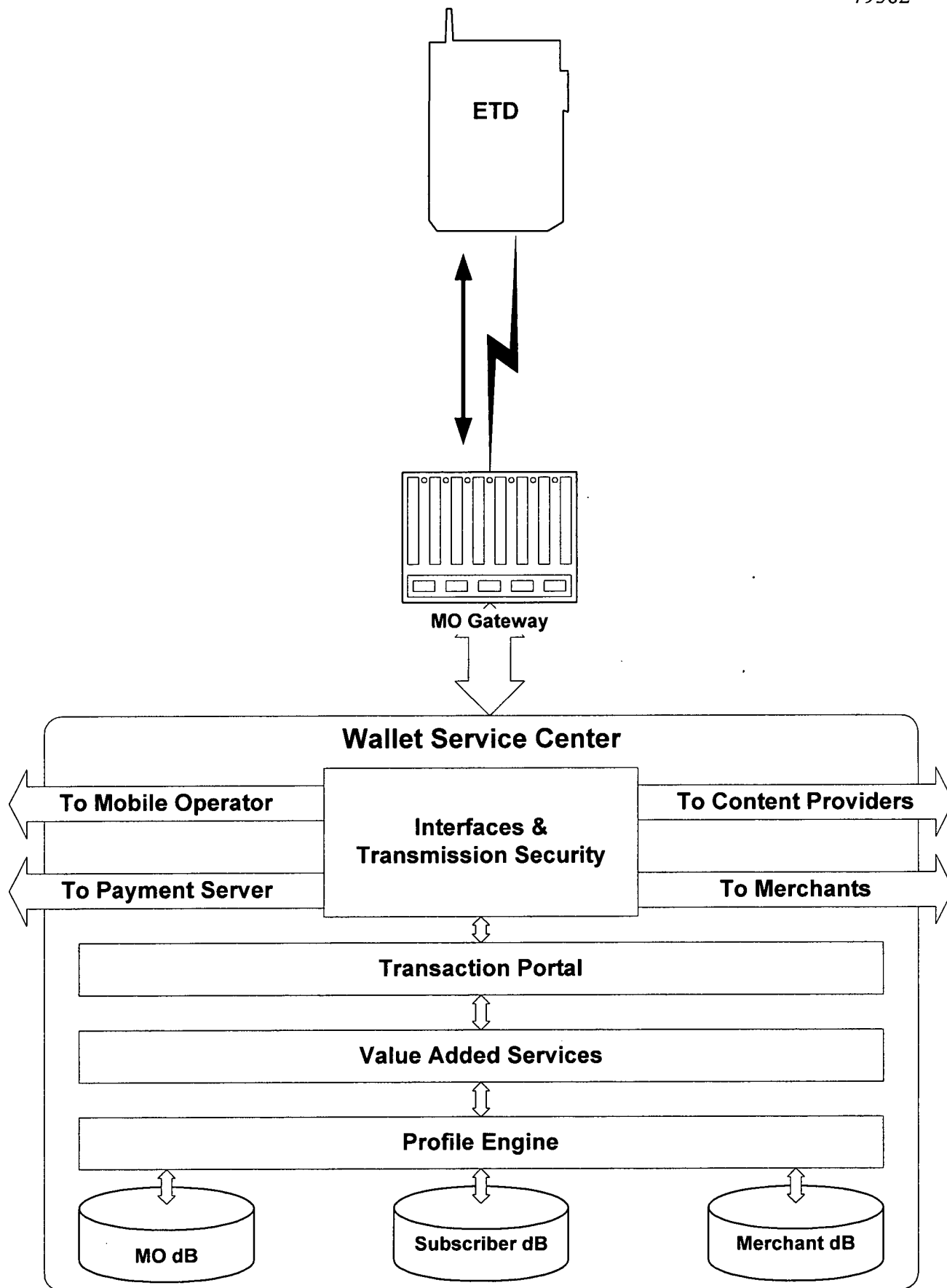


Figure 7

Only Credit Card Payment Setup Sequence Flow Chart

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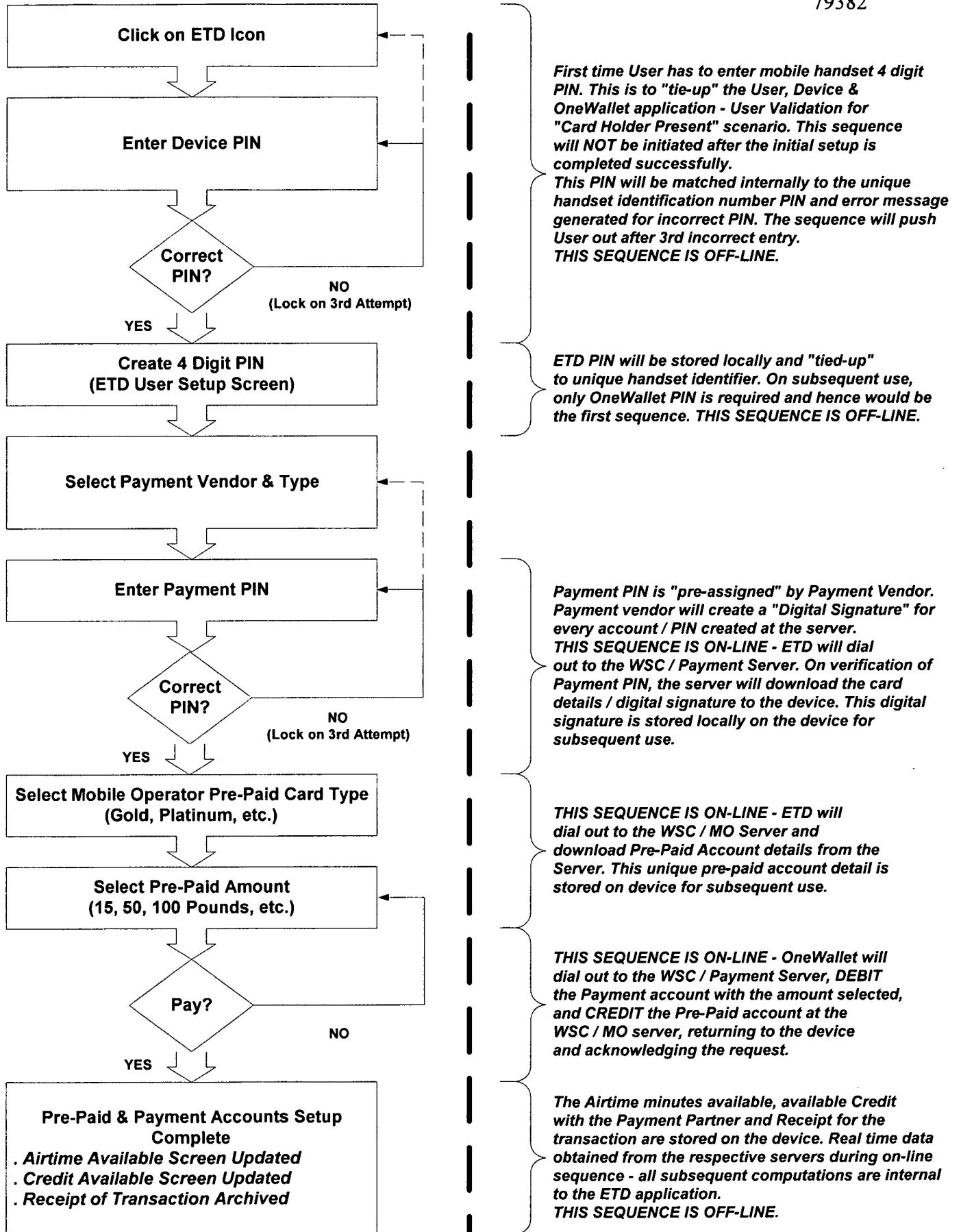


Figure 8

Only Credit Card Payment
"Top-Off" Sequence Flow Chart

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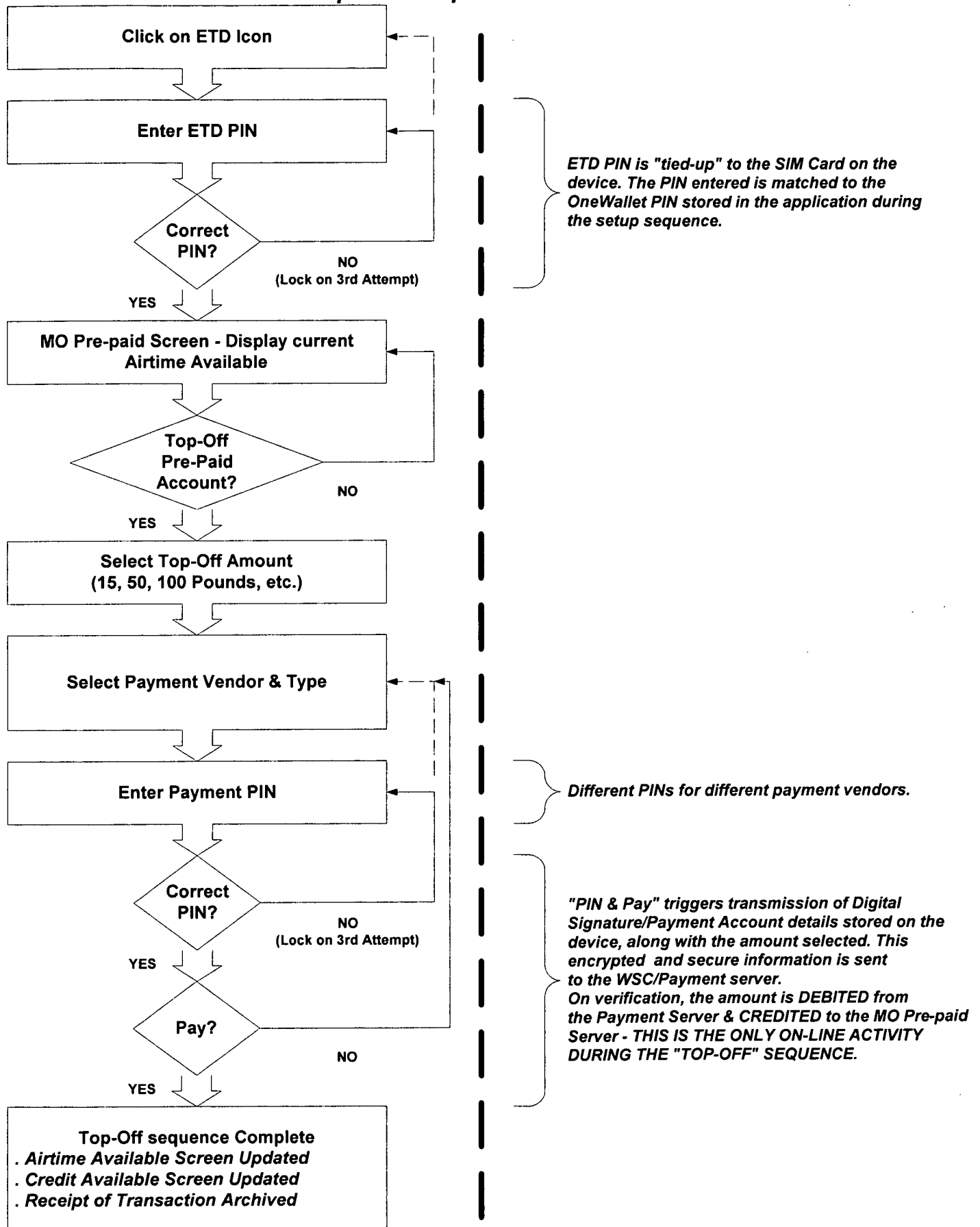


Figure 9

Only Credit Card Payment
Sample UIs

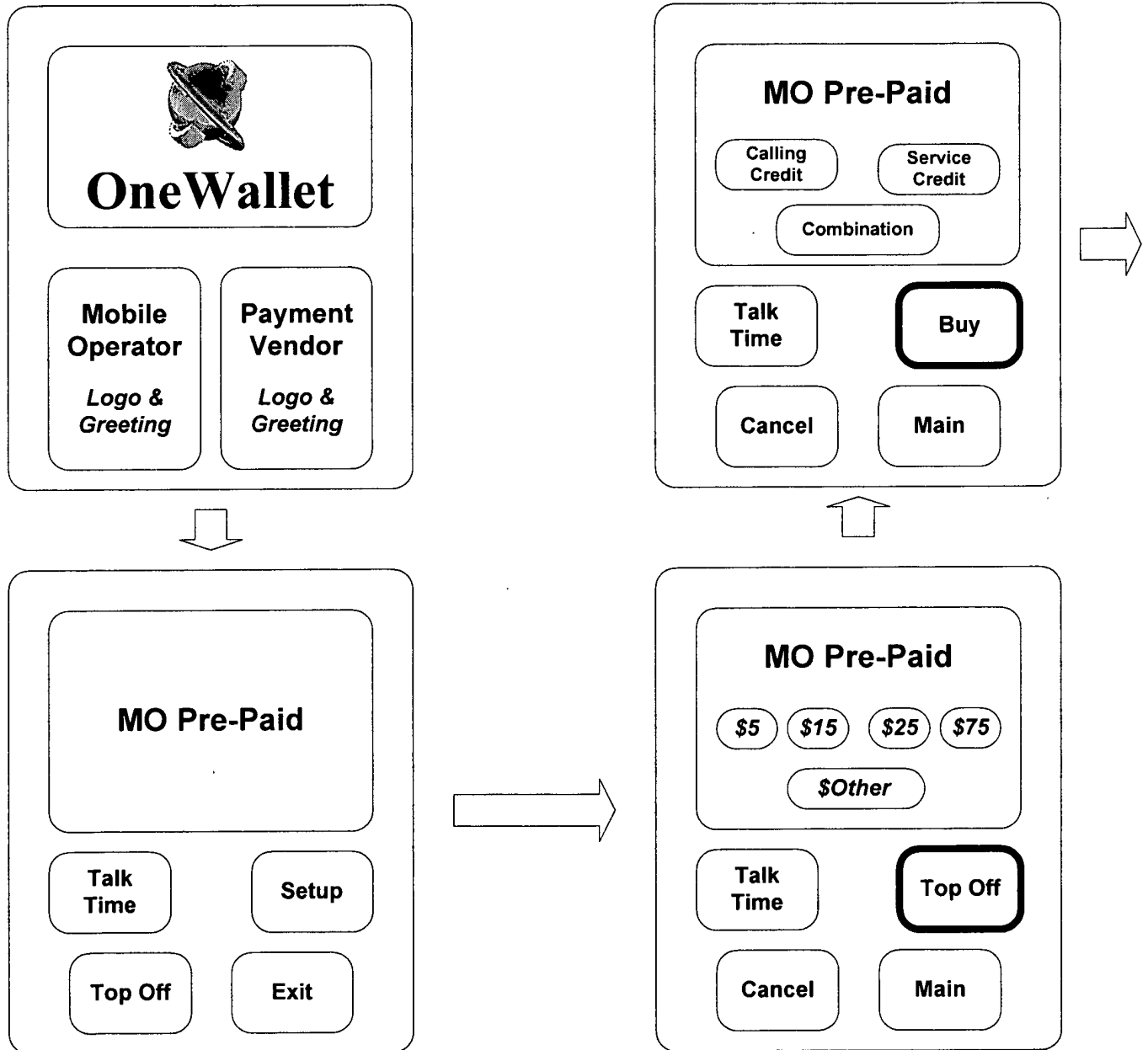


Figure 10

Only Credit Card Payment
Sample UIs

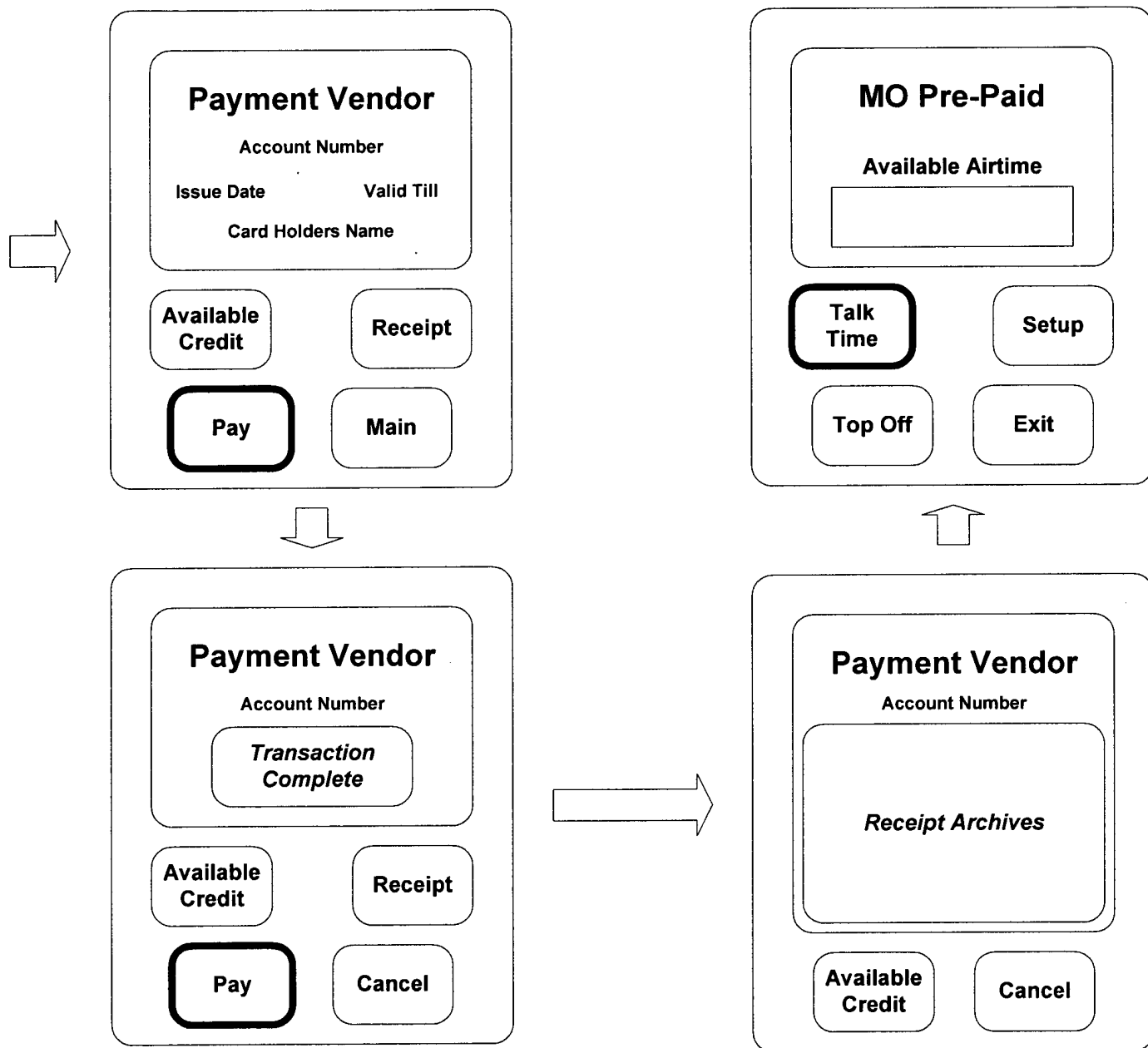


Figure 11

Merchant ETD Architecture

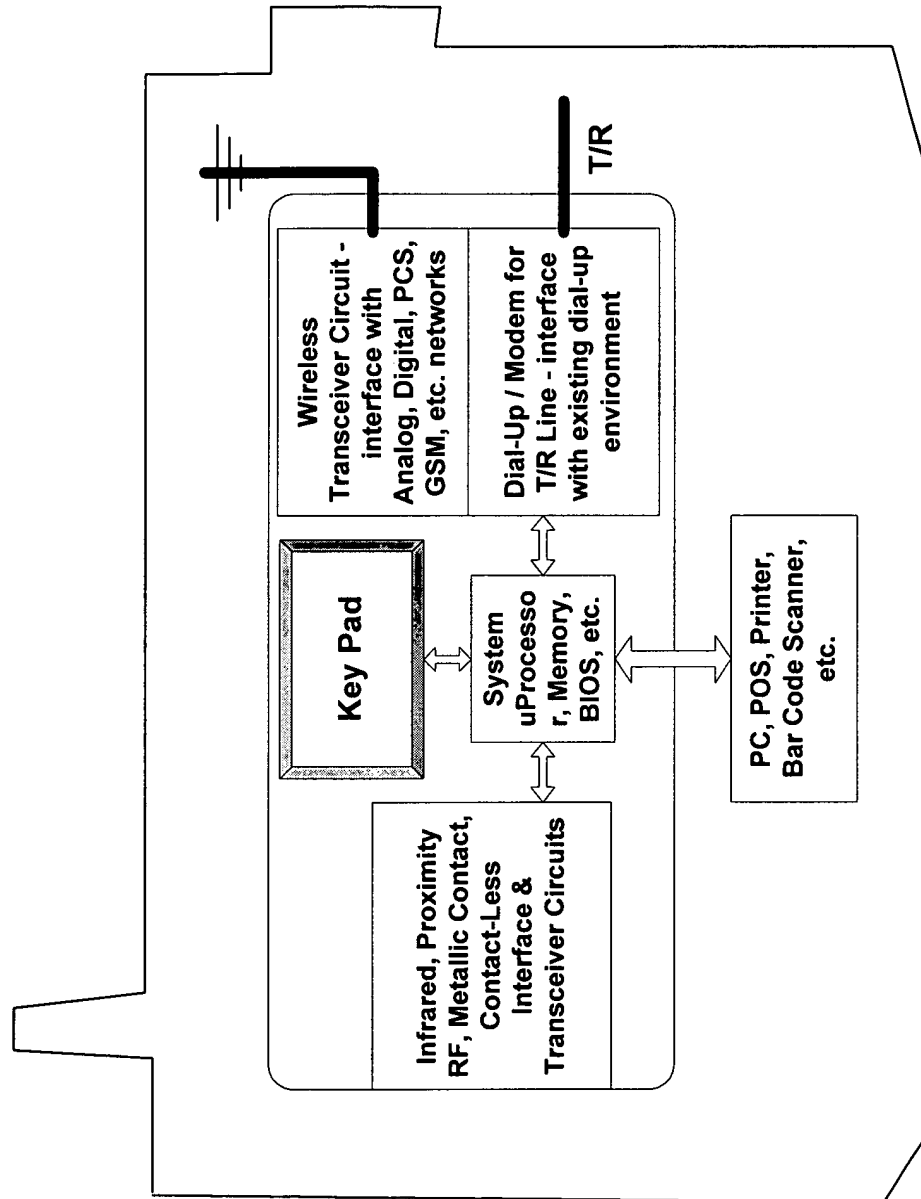


Figure 12

Merchant Wallet
Sample UIs

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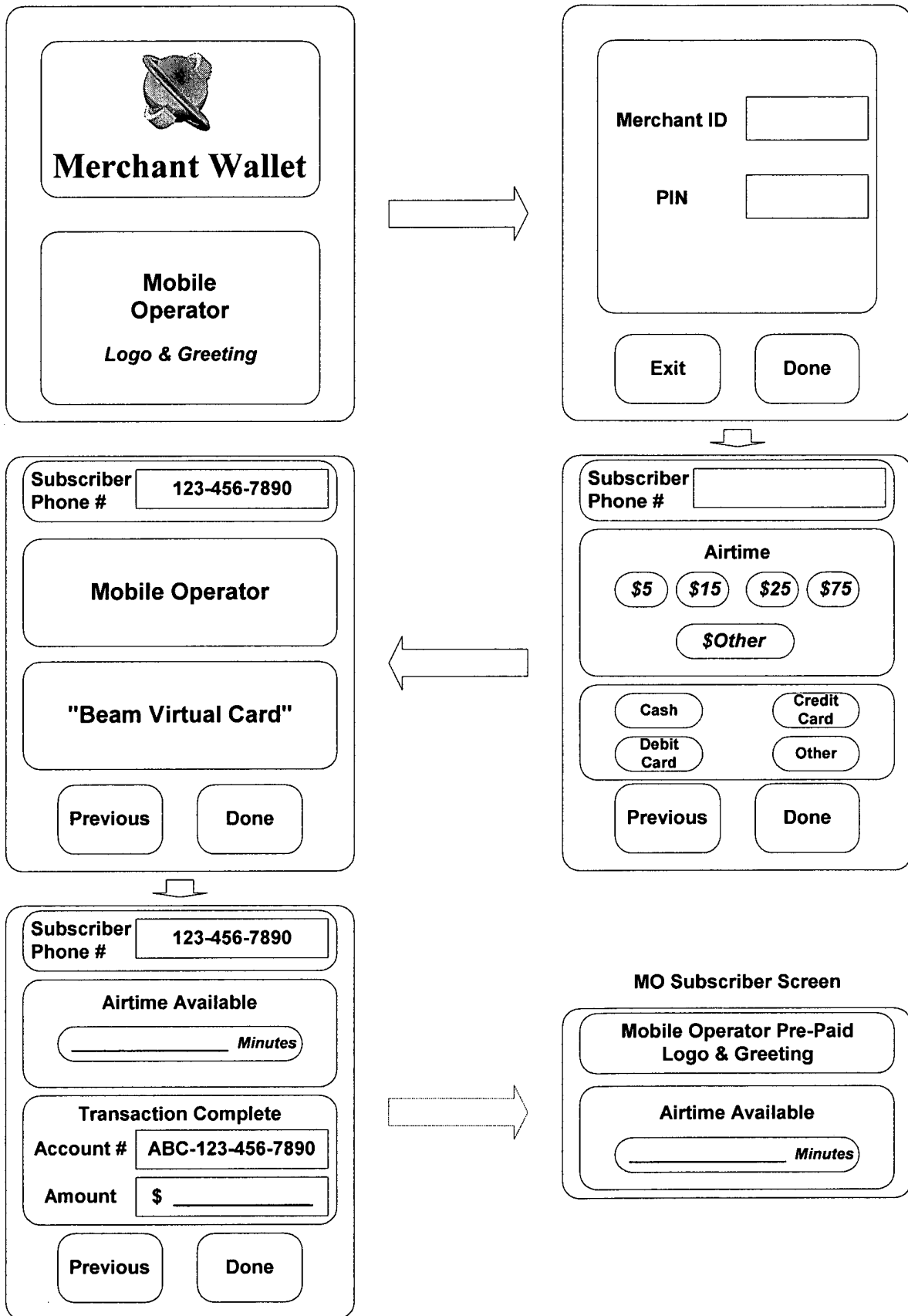


Figure 13

Wallet Service Center
Value Added Services

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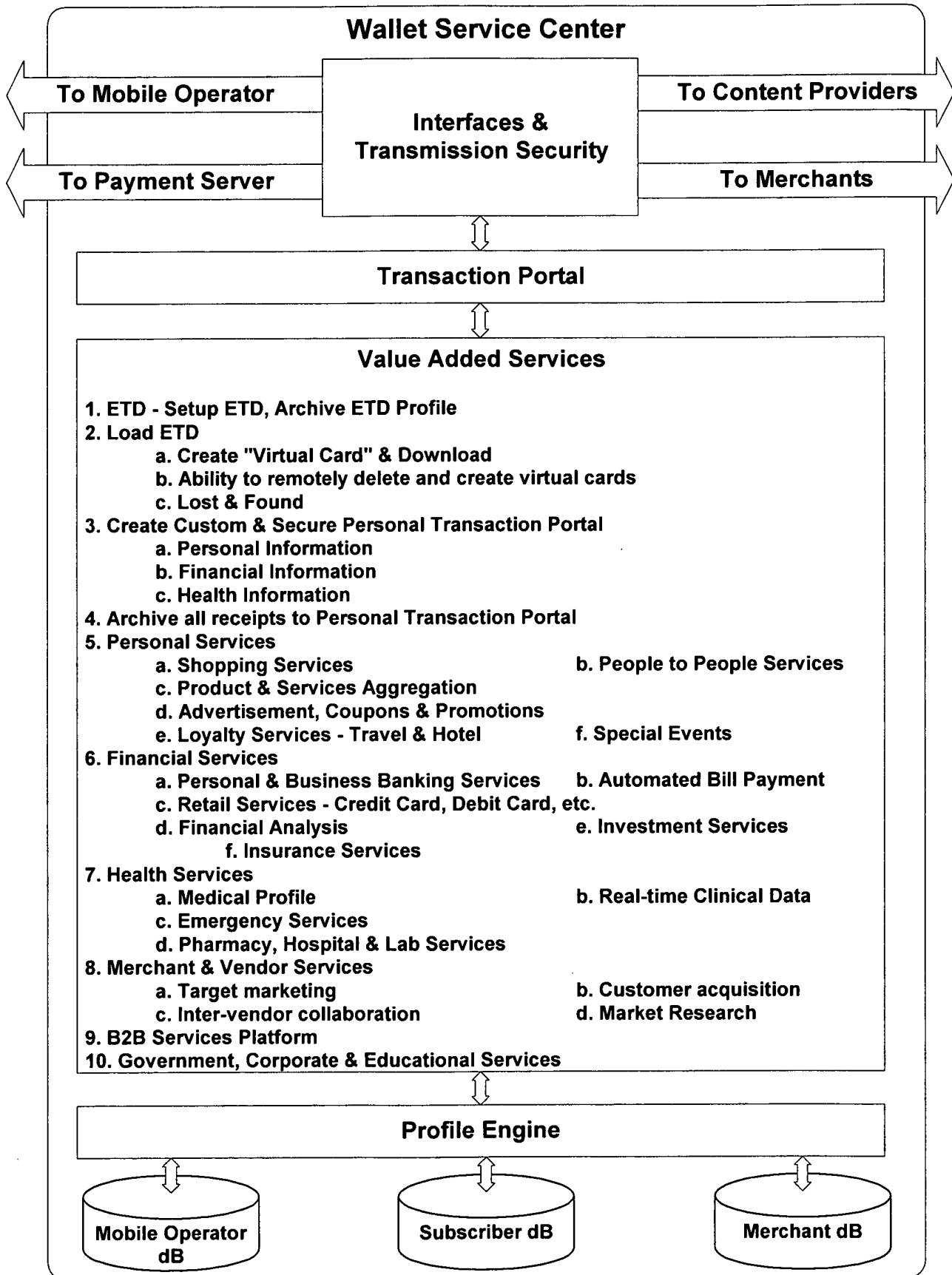
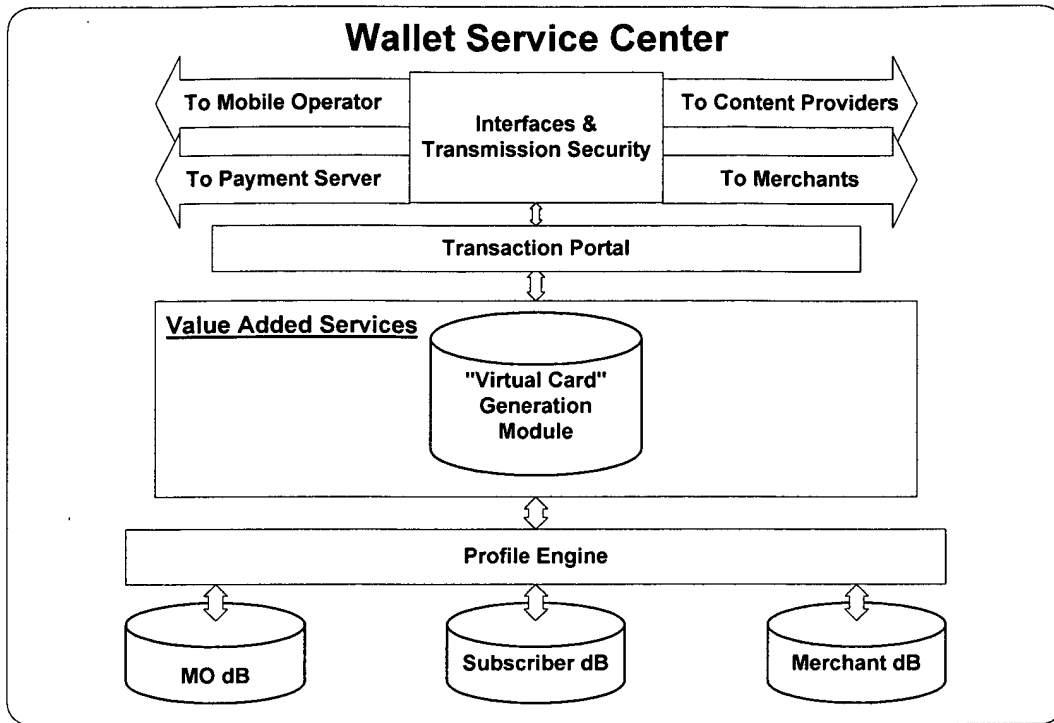
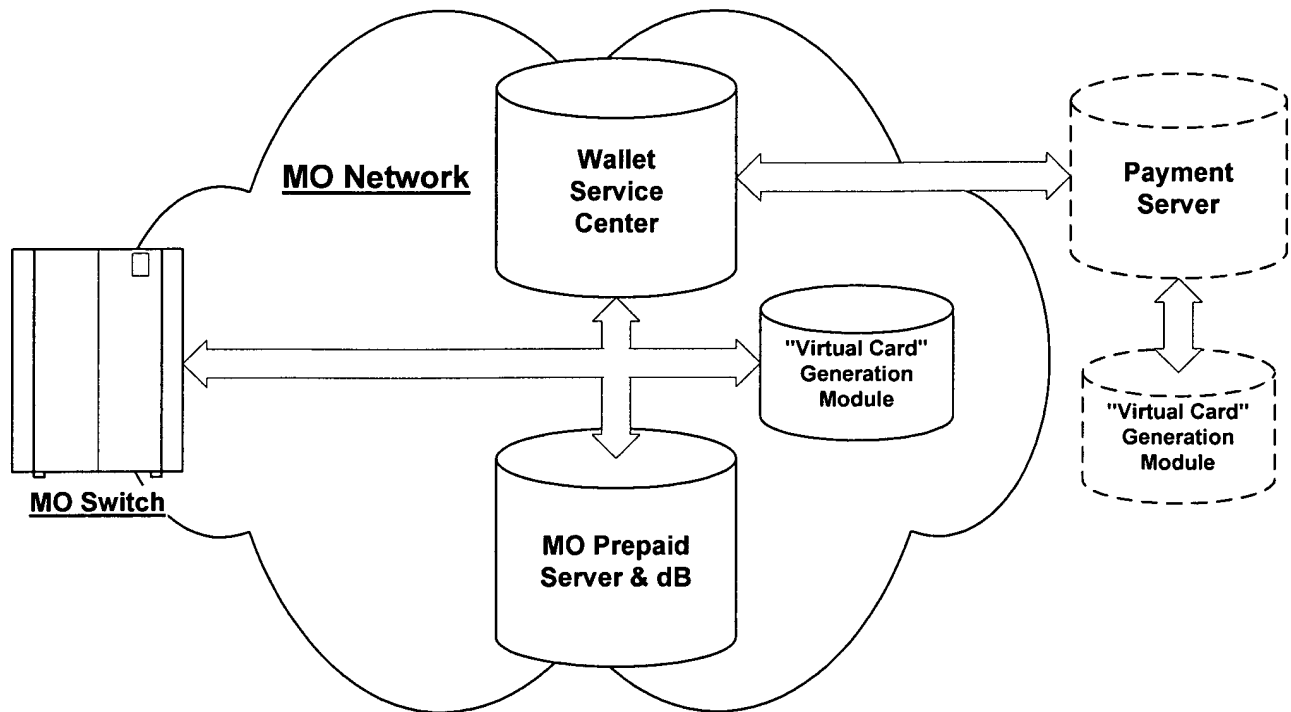


Figure 14



A



B

Figure 15

Stored Value Application

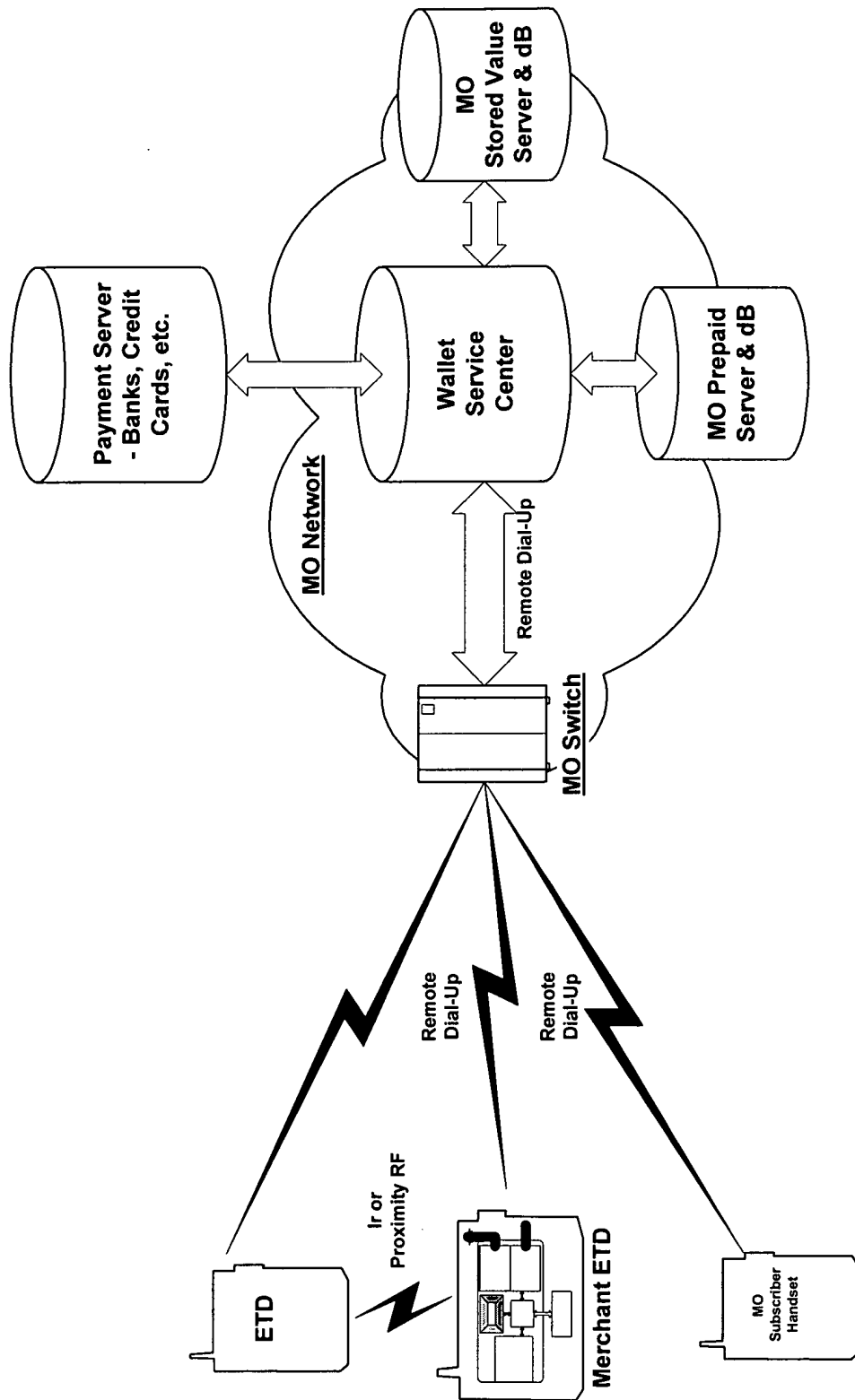


Figure 16

Multiple MO Environment

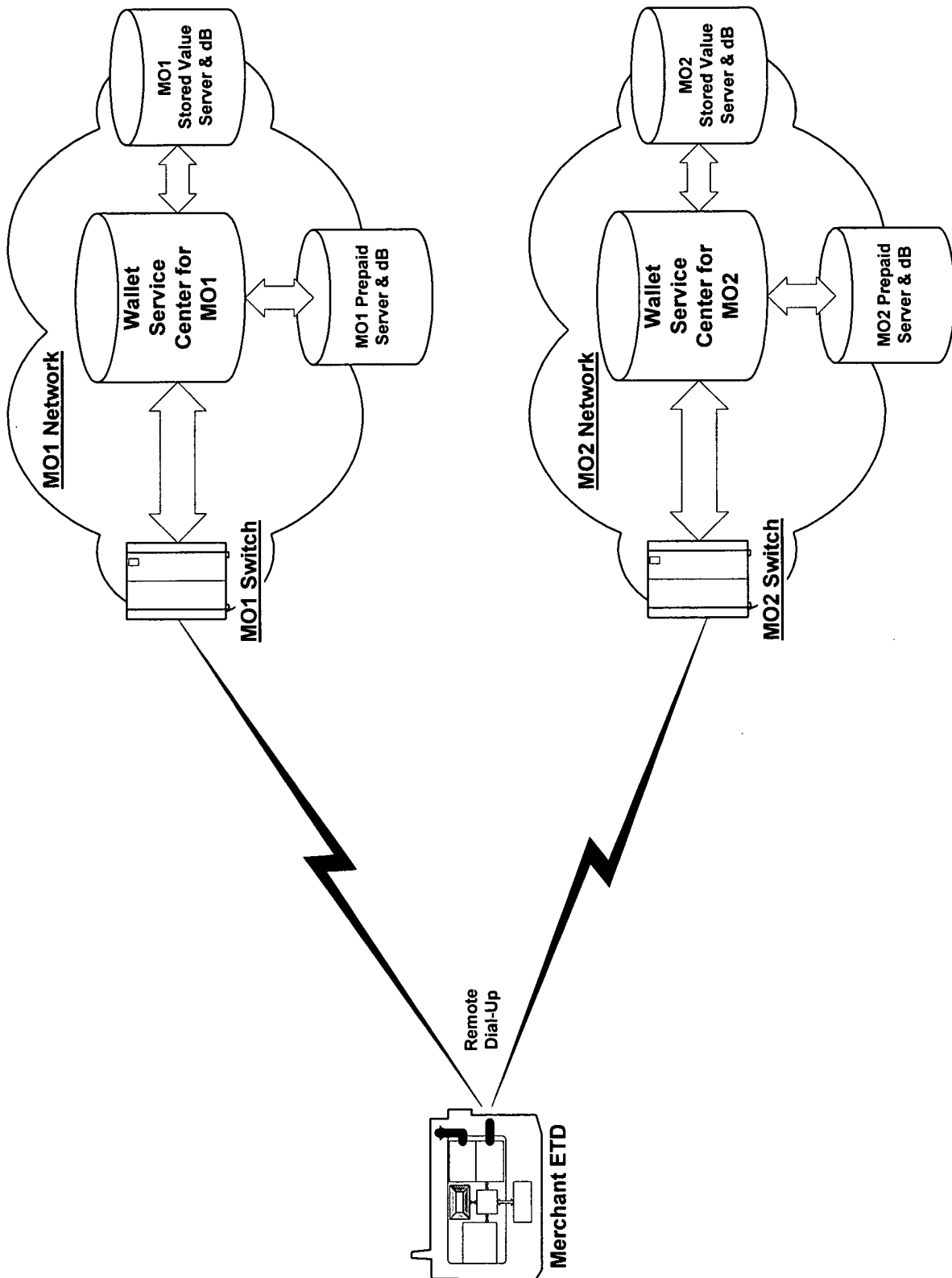


Figure 17